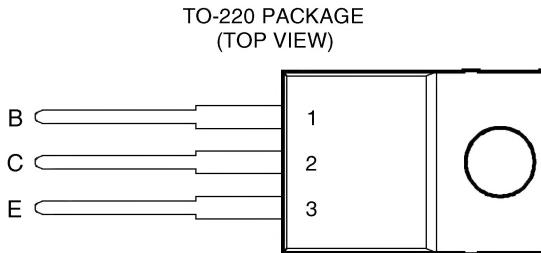


- Designed for Complementary Use with TIP100, TIP101 and TIP102
- 80 W at 25°C Case Temperature
- 8 A Continuous Collector Current
- Maximum  $V_{CE(sat)}$  of 2.5 V at  $I_C = 8$  A



Pin 2 is in electrical contact with the mounting base.

**absolute maximum ratings at 25°C case temperature (unless otherwise noted)**

RATING	SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	TIP105	-60	
	TIP106	-80	
	TIP107	-100	
Collector-emitter voltage ( $I_B = 0$ )	TIP105	-60	
	TIP106	-80	
	TIP107	-100	
Emitter-base voltage	$V_{EBO}$	-5	V
Continuous collector current	$I_C$	-8	A
Peak collector current (see Note 1)	$I_{CM}$	-15	A
Continuous base current	$I_B$	-1	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)	$P_{tot}$	80	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)	$P_{tot}$	2	W
Unclamped inductive load energy (see Note 4)	$\frac{1}{2}LI_C^2$	10	mJ
Operating junction temperature range	$T_j$	-65 to +150	°C
Storage temperature range	$T_{stg}$	-65 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds	$T_L$	260	°C

NOTES: 1. This value applies for  $t_p \leq 0.3$  ms, duty cycle  $\leq 10\%$ .

2. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.

3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

4. This rating is based on the capability of the transistor to operate safely in a circuit of:  $L = 20$  mH,  $I_{B(on)} = -5$  mA,  $R_{BE} = 100 \Omega$ ,  $V_{BE(off)} = 0$ ,  $R_S = 0.1 \Omega$ ,  $V_{CC} = -20$  V.

# TIP105, TIP106, TIP107

## PNP SILICON POWER DARLINGTONS

### electrical characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage (see Note 5)	$I_C = -30 \text{ mA}$	$I_B = 0$	TIP105 TIP106 TIP107	-60 -80 -100			V
$I_{CEO}$	Collector-emitter cut-off current	$V_{CE} = -30 \text{ V}$ $V_{CE} = -40 \text{ V}$ $V_{CE} = -50 \text{ V}$	$I_B = 0$	TIP105 TIP106 TIP107			-50 -50 -50	$\mu\text{A}$
$I_{CBO}$	Collector cut-off current	$V_{CB} = -60 \text{ V}$ $V_{CB} = -80 \text{ V}$ $V_{CB} = -100 \text{ V}$	$I_E = 0$	TIP105 TIP106 TIP107			-50 -50 -50	$\mu\text{A}$
$I_{EBO}$	Emitter cut-off current	$V_{EB} = -5 \text{ V}$	$I_C = 0$				-8	mA
$h_{FE}$	Forward current transfer ratio	$V_{CE} = -4 \text{ V}$ $V_{CE} = -4 \text{ V}$	$I_C = -3 \text{ A}$ $I_C = -8 \text{ A}$	(see Notes 5 and 6)	1000 200		20000	
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_B = -6 \text{ mA}$ $I_B = -80 \text{ mA}$	$I_C = -3 \text{ A}$ $I_C = -8 \text{ A}$	(see Notes 5 and 6)			-2 -2.5	V
$V_{BE}$	Base-emitter voltage	$V_{CE} = -4 \text{ V}$	$I_C = -8 \text{ A}$	(see Notes 5 and 6)			-2.8	V
$V_{EC}$	Parallel diode forward voltage	$I_E = -8 \text{ A}$	$I_B = 0$	(see Notes 5 and 6)			-3.5	V

NOTES: 5. These parameters must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

6. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

### thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1.56	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Junction to free air thermal resistance			62.5	$^{\circ}\text{C}/\text{W}$
$C_{\theta C}$	Thermal capacitance of case		0.9		$\text{J}/^{\circ}\text{C}$

### resistive-load-switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS <sup>†</sup>			MIN	TYP	MAX	UNIT
$t_d$	Delay time					35		ns
$t_r$	Rise time	$I_C = -8 \text{ A}$	$I_{B(on)} = -80 \text{ mA}$	$I_{B(off)} = 80 \text{ mA}$		300		ns
$t_s$	Storage time	$V_{BE(off)} = 5 \text{ V}$	$R_L = 5 \Omega$	$t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		900		ns
$t_f$	Fall time					1.3		$\mu\text{s}$

<sup>†</sup> Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

### TYPICAL CHARACTERISTICS

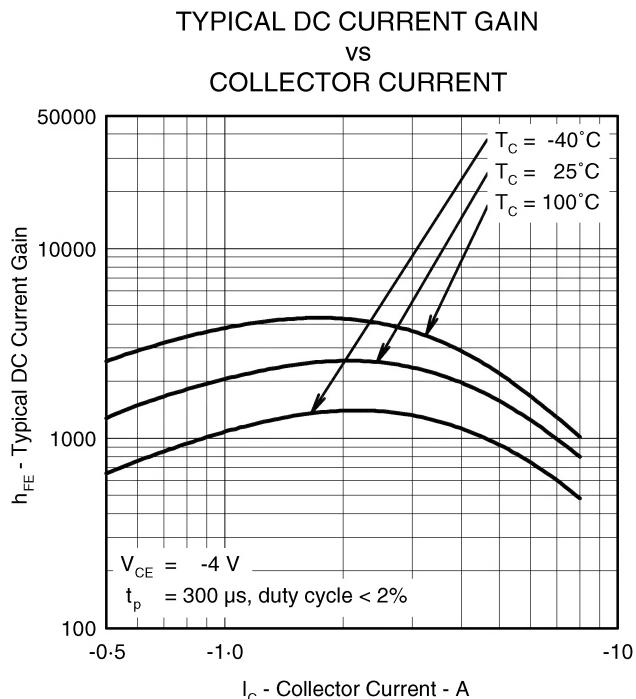


Figure 1.

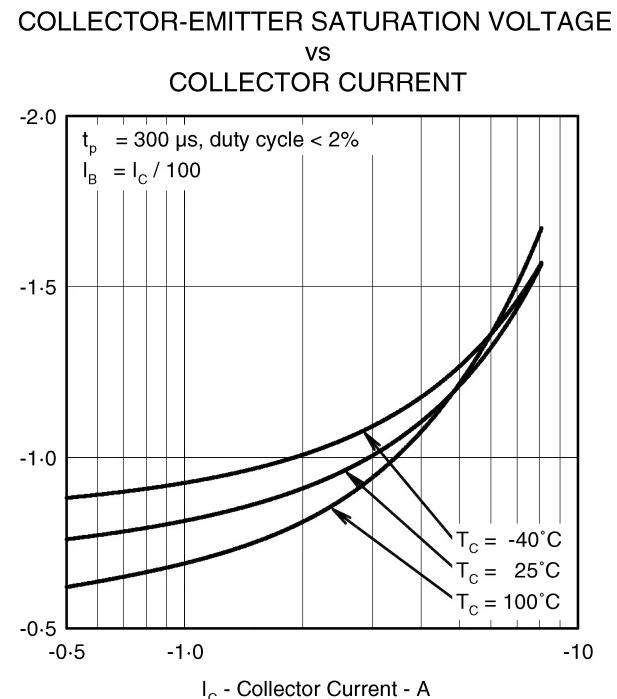


Figure 2.

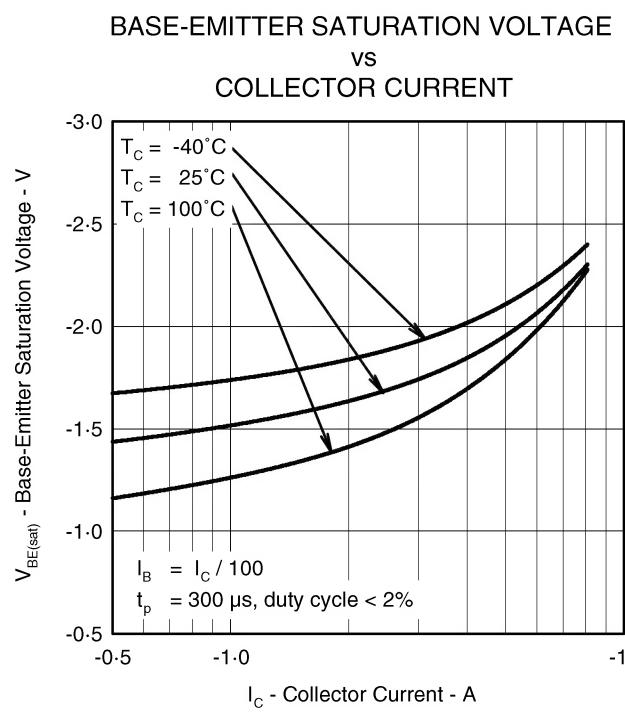


Figure 3.

**TIP105, TIP106, TIP107  
PNP SILICON POWER DARLINGTONS**

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**MAXIMUM SAFE OPERATING REGIONS**

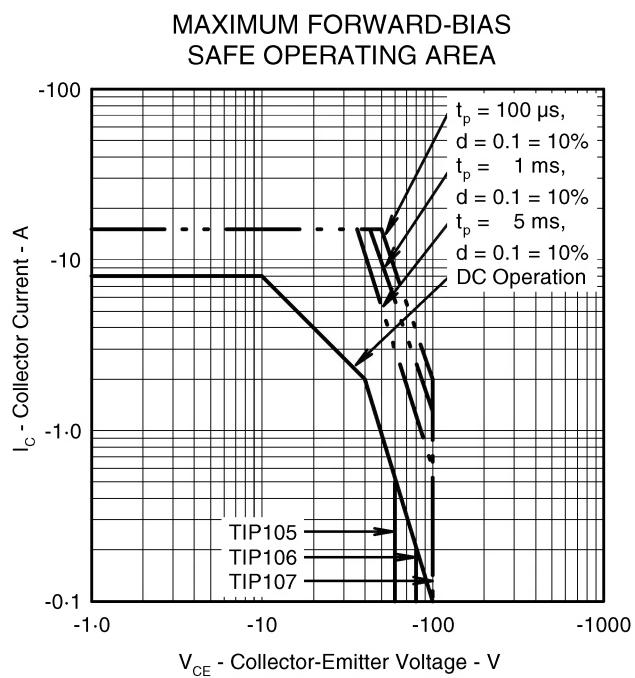


Figure 4.

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**THERMAL INFORMATION**

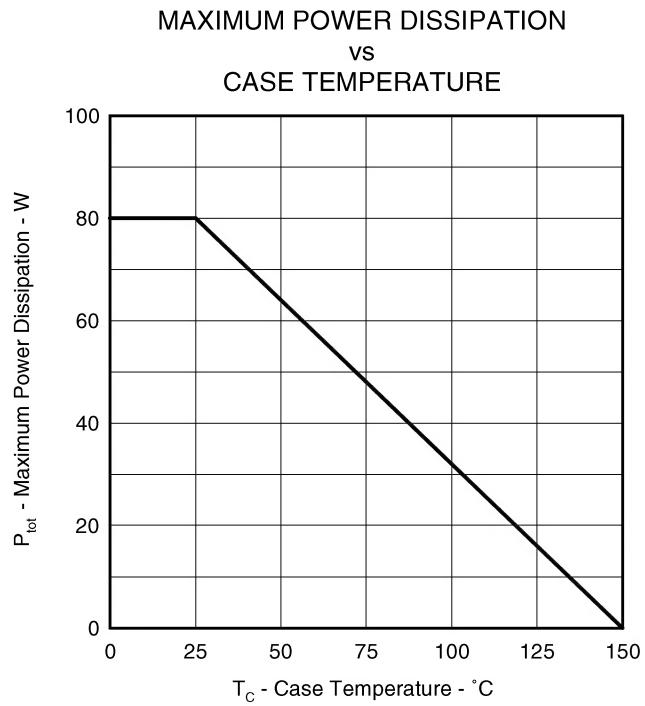


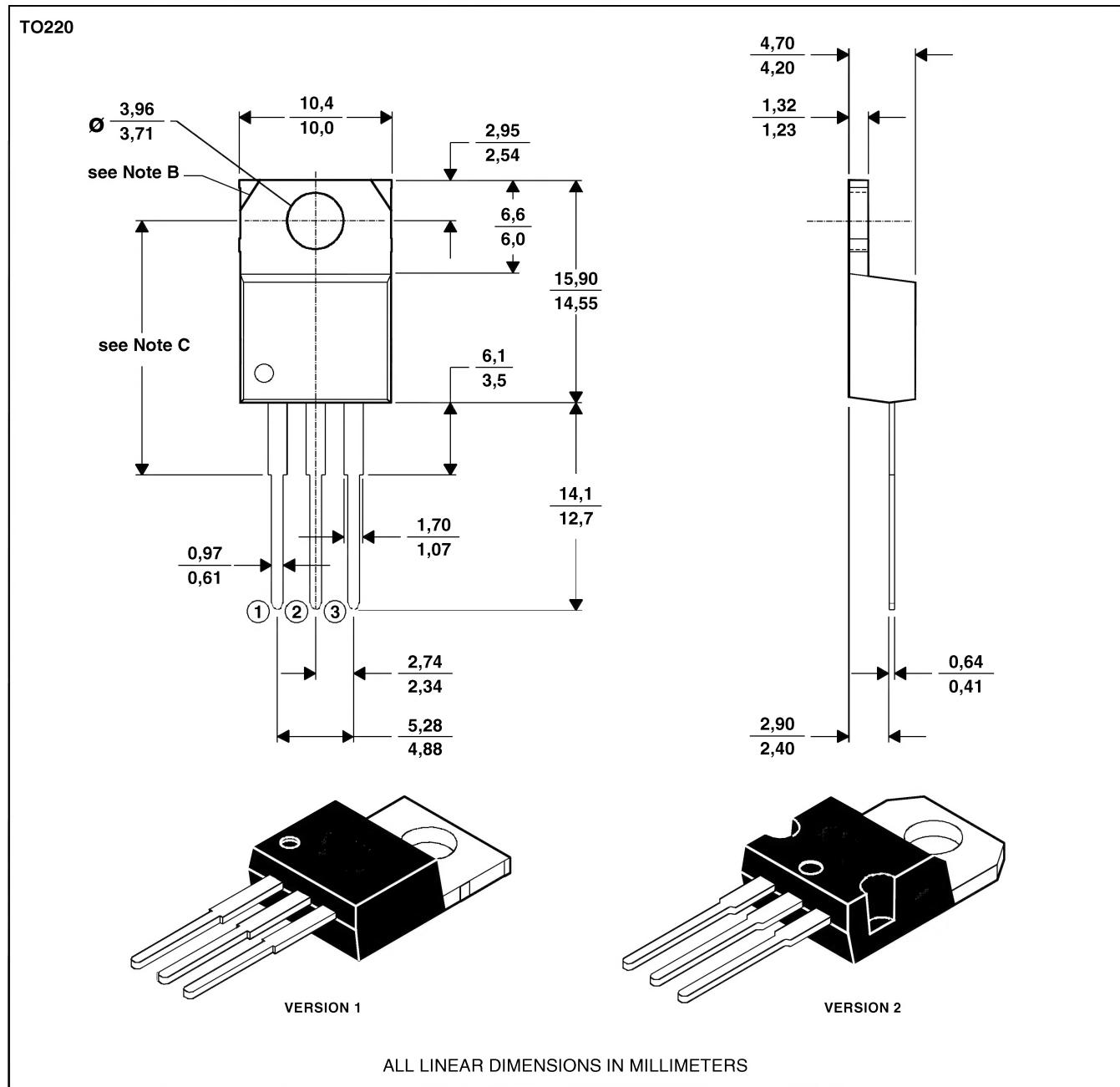
Figure 5.

## MECHANICAL DATA

### TO-220

3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTES: A. The centre pin is in electrical contact with the mounting tab.  
 B. Mounting tab corner profile according to package version.  
 C. Typical fixing hole centre stand off height according to package version.  
 Version 1, 18.0 mm. Version 2, 17.6 mm.